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EDITORIAL

Breast Cancer Imaging and Detection

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Breast imaging is a fast-advancing subspecialty in radiology owing to the magnitude of its demand for breast cancer detection.

X-ray mammography is a widely available, relatively inexpensive, and repeatable method for breast cancer detection. However, the sensitivity and cancer detection rate of mammography is significantly reduced in women with dense breast tissues, because lesions may be obscured by breast densities. Digital breast tomosynthesis (DBT) reduces overlap of breast tissue, reducing false-positive recalls across breast density categories.[1] The sensitivity of DBT has been reported as 81% for single-view DBT versus 60% for two-dimensional mammography in a prospective population-based screening.[2] In Hong Kong, more and more DBT machines have been installed in radiology departments of Hospital Authority hospitals as part of the scheduled equipment replacement programme, and local experience with DBT is growing. Major screening centres in Hong Kong have adopted DBT, including the community-based Breast Health Centre established by the Hong Kong Breast Cancer Foundation with funding from the Hong Kong Jockey Club Charity Trust.

In the current issue of *Hong Kong Journal of Radiology*, Fung et al[3] describe their experience of the most common sonographic occult non-calcified breast lesions detected by DBT: architectural distortion and focal asymmetry. The authors achieved successful tissue sampling in 97% of subjects without significant complications, and about 8% of ultrasound-occult but DBT-detectable lesions were found to be malignant.

Breast magnetic resonance imaging (BMRI) is another proposed modality for breast screening. Recently abbreviated BMRI has been introduced to reduce the complexity and cost of MRI. Multiple studies have confirmed equivalent diagnostic accuracy of abbreviated BMRI with full MRI protocols.[4] With shorter acquisition and interpretation time than conventional BMRI, abbreviated BMRI is more accessible.[5]

Kim[6] compare the detectability of breast cancer by unenhanced abbreviated BMRI based on diffusion-weighted imaging (DWI) with that by postcontrast abbreviated BMRI. The diagnostic accuracy was comparable between the two techniques, but the specificity of DWI was slightly higher than that of postcontrast MRI. Although alleviating patients from the pain and potential hazard of intravenous contrast such as allergy and gadolinium deposition in the brain, the false-negative rate of unenhanced abbreviated BMRI was higher than that of postcontrast abbreviated BMRI, especially for small cancers (≤10 mm). In addition, malignant lesions with high water content such as mucinous carcinoma or triple-negative cancer with extensive necrosis might not be picked up by DWI-unenhanced MRI owing to the high apparent diffusion coefficient values within these lesions.

With increasing utilisation of screening mammography and public awareness of self-examination of breasts, early and smaller non-palpable breast cancer lesions can be detected. For other patients with more advanced local breast cancer, sufficient tumour shrinkage might also be achieved after neoadjuvant chemotherapy. Breast-conserving therapy rather than mastectomy is advocated as the main surgical option for suitable candidates, with the end goals of excising the tumour to negative margins while providing satisfactory cosmesis. Image-guided preoperative localisation is important for accurate lesion identification and successful surgical excision in breast-conserving therapy. Preoperative localisation techniques for breast and axillary lesions have evolved to include both wire and nonwire methods. The conventional hookwire localisation has been increasingly replaced by newer wireless localisation techniques such as radioactive seeds, magnetic seeds, radar reflectors, and radiofrequency identification

tag localisers owing to their increased scheduling flexibility.[7]

Wong et al[8] review cases and discuss stereotactic radioguided occult lesion localisation and sentinel node localisation. The authors found that these techniques were effective in localising nonpalpable breast lesions with a high surgical success rate. The authors commented that invasive carcinoma was associated with worse target localisation while injection of radioisotope in a lateromedial approach was associated with better target localisation.

Tsui et al[9] compare the performance of non-radiative magnetic marker in wireless localisation with radioguided occult lesion localisation. They found significant lower intra-operative re-excision rate when using magnetic marker localisation. Successful placement of the magnetic marker was 100% with ultrasound guidance and 85% with stereotactic guidance. There was displacement of the magnetic marker during the interval between localisation and operation (4-14 days), but this was non-significant and did not affect the overall surgical success rate of removing the occult breast lesions. The authors commented that magnetic marker localisation was more efficient in workflow and allows flexibility in appointment arrangement. Indeed, nonwire localisation can be performed days ahead of the operation dates, at the convenience of both patients and radiologists. This technique may be particularly important in maintaining the capacity to support ongoing patient management amidst the unprecedented operation scheduling challenges in the coronavirus disease 2019 pandemic.

Hong Kong Journal of Radiology serves as a platform for sharing experience of recently developed and advanced new imaging techniques among different centres in Hong Kong or internationally. Although the main aim of breast imaging is for breast cancer detection, there is a wide spectrum of non-cancerous breast lesions that are commonly encountered in our daily practice. Chan et al[10] provide a pictorial review of echogenic lesions detected on ultrasound, and Chow et al[11] illustrate breast manifestations in systemic lupus erythematosus. Knowledge of these lesions can help radiologists to improve diagnostic confidence for lesions with characteristic radiological appearance and avoid unnecessary biopsy or surgery.

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